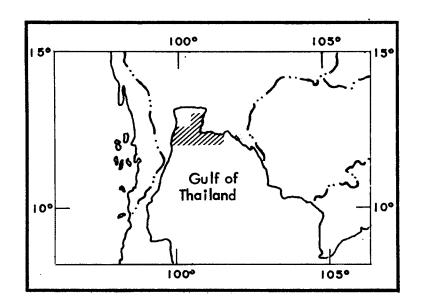
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INFORMAL REPORT

# ENVIRONMENTAL DATA REPORT GULF OF THAILAND DECEMBER 1967 TO FEBRUARY 1968



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AUGUST 1969

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NAVAL OCEANOGRAPHIC OFFICE WASHINGTON, D. C. 20390

# INFORMAL REPORT

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#### ABSTRACT

The U.S. Naval Oceanographic Office and the Royal Thai Navy conducted a joint environmental survey in the Gulf of Thailand from 20 December 1967 to 21 February 1968. Operations included serial-depth temperature and salinity measurements at 57 station locations and current meter observations at 47 of the stations.

The area surveyed in the Gulf of Thailand was found to be nearly isothermal and isohaline throughout the water column, which attests to a well-developed mixing environment. The tidal currents in the gulf are thought to be responsible for the homogenous nature of the water. Characteristic of the region surveyed was the variance in current direction with depth for any one station location and the change in current vectors over short durations. Measured current speeds ranged to a maximum of 0.8 knot.

DALE E. KENNEY
Nearshore Surveys Division
Oceanographic Surveys Department

This report has been reviewed and is approved for release as an UNCLASSIFIED Informal Report.

L. B. BERTHOLF

Director, Nearshore Surveys Division

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#### I. INTRODUCTION

An environmental survey was conducted in the Gulf of Thailand as a joint operation of the U.S. Naval Oceanographic Office (NAVOCEANO) and the Royal Thai Navy aboard HTMS BANGRACHAN (MMC 1) from 20 December 1967 to 21 February 1968. Operations were performed in the inner gulf and in the inshore area southeast of Sattahip (Operation Numbers 928026 and 928029). Figure 1 is a locator chart of the survey area.

From 1959 to 1961, a comprehensive survey in the Gulf of Thailand was the Naga Expedition (Wyrtki, 1961). NAVOCEANO surveys aboard USS FIRM (MSO 444) and USS SERRANO (AGS 24) in 1959 and 1961, respectively, supplied further background data. Personal conversation with Royal Thai Navy Hydrographic Office personnel provided valuable information, especially on the oceanographic vagaries that may be encountered within the gulf.

#### II. OBJECTIVES OF THE SURVEY

The objectives of NAVOCEANO operations aboard BANGRACHAN were to obtain environmental oceanographic data in the inshore areas of the Gulf of Thailand. The data required were current measurements and serial-depth temperatures and salinities.

#### III. NARRATIVE OF THE SURVEY

Royal Thai Navy (RTN) personnel and one NAVOCEANO oceanographer collected the environmental data from BANGRACHAN. A total of 57 stations was occupied. At each station, a Nansen cast and a bathythermograph (BT) lowering were made, and at 47 of the stations, current measurements were obtained. Figure 2 shows the station locations with current vectors indicated for the stations. Table I presents a station data summary.

#### IV. METHODS OF COLLECTION AND ANALYSIS

#### A. Temperature.

A shallow water mechanical BT was lowered at each station location to ascertain the existing temperature structure. The BT traces showed the shallow gulf areas to be nearly isothermal throughout the water column. Because of the isothermal condition, three or four Nansen bottles, each with three protected reversing thermometers, were evenly spaced throughout the water column. The temperatures from the three thermometers were averaged if the values were within 0.05°C. When temperatures differed more than 0.05°C, the values from the more reliable thermometers, based on past performances, were accepted. Thermometer

Wyrtki, K., 1961. Physical Oceanography of Southeast Asian Waters. NAGA Report. Vol. 2.

performance in the field was checked by rotating individual thermometers from one Nansen bottle to another. A correction factor for errant thermometers was then derived by statistical analysis from the different thermometer pairings. The temperatures from reversing thermometers, after applying standard and individual corrections, are considered accurate to  $\pm 0.02\,^{\circ}\text{C}$ .

#### B. Salinity.

Water samples were drawn from the Nansen bottles and forwarded to NAVOCEANO for salinity analyses. Salinities were determined with an Industrial Instruments RS-7A inductive salinometer. Results are considered accurate to  $\pm 0.01$  o/oo.

#### C. Conductivity.

Conductivity values were hand computed from Nansen cast temperature and salinity data by the method described in NAVOCEANO Special Publication No. 11, "Tables for the Rapid Computation of Density and Electrical Conductivity of Sea Water."

#### D. Current Measurements.

A Roberts current meter was used to obtain in situ current measurements. BANGRACHAN was anchored fore and aft, and the meter was suspended from the stern. Readings generally were obtained 3 meters below the surface, at middepth, and 2 meters from the bottom. Interference from the ship's hull precluded any accurate current measurement less than 3 meters below the surface. An EA Recorder was used to give continuous readings. Current velocities were recorded for 4 to 6 minutes or, when low current speeds were evident, until a record of sufficient length was attained to allow a recognizable trend in current vectors.

When current speeds were less than 0.2 knot, the recordings of current direction usually deteriorated. In the presentation of this report, current speeds less than 0.2 knot were not used but are listed on the oceanographic summary sheets in the Appendix as "<2 knot" to indicate the presence of some current.

#### E. Meteorological Observations.

Meteorological observations were recorded by the oceanographer utilizing hand held equipment and by visual observations. Recorded information consisted of wind vectors, humidity, weather, cloud, and sea and swell observations.

#### F. Tidal Data.

Tidal values are predicted values from USC&GS tide tables for

Sattahip and Bangkok, Thailand. Cotidal charts were used to approximate tidal ranges and times for the western coast of the survey area.

#### V. DISPOSITION OF DATA

The current measurement data are on file at NAVOCEANO, and Nansen cast data and BT slides will be on file at the National Oceanographic Data Center. Individual oceanographic summary sheets are presented in the Appendix.

#### VI. PRELIMINARY ANALYSIS

#### A. Temperature.

All 57 stations were occupied during the daylight hours from approximately 0800 to 1600 hours (local). Positive temperature gradients, resulting from back radiation during the night, were a common occurrence until late morning when the gradient assumed either an isothermal or a negative profile. The temperature range throughout the water column was 26.50° to 27.73°C. At any one station, the temperature difference from surface to bottom did not exceed 0.54°C, and at 70 percent of the stations, the difference was within 0.30°C. Sea surface temperatures off the western part of the inner gulf averaged 0.25°C higher than surface temperatures off the eastern part and 0.60°C higher than in the area southeast of Sattahip. The nearly isothermal structure observed within the Gulf of Thailand attests to a well-developed mixing environment.

#### B. Salinity.

The salinity values throughout the survey area ranged from 31.70 to 32.45 o/oo. At any one station, the maximum difference from surface to bottom was 0.10 o/oo, and for 81 percent of the stations, the difference was only 0.03 o/oo. This display of vertical homogeneity and relatively little horizontal variation in salinity values also attests to a region of well-developed mixing.

Salinities in the area southeast of Sattahip were 0.10 to 0.14 o/oo higher than those in the inner gulf. A higher salinity can often be expected in areas outside the inner gulf because of less stream discharge.

## C. Current Measurements.

The circulation pattern in the gulf proper is most dependent on the monsoon season. A small, permanent counterclockwise gyre occurs within the inner gulf (from personal conversation with RTN personnel). Subsequently, the gulf, and especially the region where the inner gulf and the gulf proper adjoin (approximately 12°40.0"N), is an area of complex water movement. During the survey period, circulation

within the inner gulf appeared to be dominated by the tidal currents which are thought to be responsible for the homogenous nature of the oceanographic environment.

Measured current speeds ranged to a maximum of 0.8 knot. The higher speeds occurred in the inner gulf during the ebb tide, and the flow was predominantly to the south. Characteristic of the region surveyed was the variance in current direction with depth for any one station and the change in current vectors over short durations. Attendant to these characteristics was the fluctuations of current, for a given depth, between two distinct directions. Station 94 exhibited some of the above characteristics; i.e., at the surface, the current set was 290°; at middepth, the set was either 270° or 070°; and near bottom, the set was 070°.

Data from two 24-hour current stations from the 1961 SERRANO cruise are shown in a time-depth presentation in Figure 3. The two station locations are plotted in Figure 2. The area surrounding station 2 was surveyed by NAVOCEANO in three different years: March 1959, March 1961, and February 1968. Current flow in this area is strongly affected by the coastal topography and the tides and is predominantly of the reversing type with strong horizontal shear currents. Data from station 1A, which is located in the inner gulf, depict the variation in current direction with depth for any one time frame.

#### D. Meteorological Observations and Tidal Data.

The period of the survey was during the inter-monsoon season, and the winds displayed such random circulation patterns that their effect on the measured oceanographic parameters was masked by tidal influence.

Tides were chiefly diurnal or semidiurnal with large inequalities between the ranges of successive highs or lows. The maximum predicted tidal range at Sattahip on the eastern coast of the inner gulf was 9 feet 8 inches. The tidal range was slightly higher on the western coast.

#### VII. FUTURE WORK IN THE REGION

The Royal Thai Navy Hydrographic Office has an ambitious oceanographic program outlined for the waters contigious to Thailand. The program will provide for a year-round study of Thai waters and will include the region surveyed by NAVOCEANO.

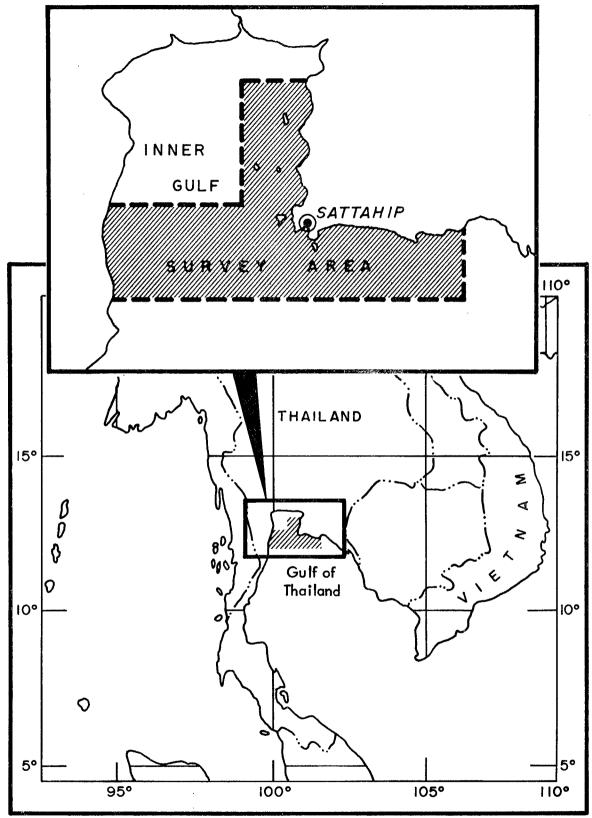


FIGURE 1. Locator Chart of the Survey Area.

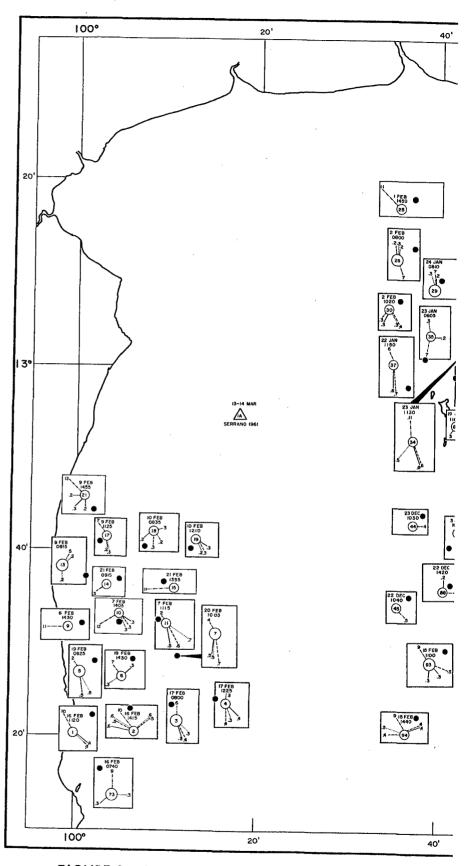
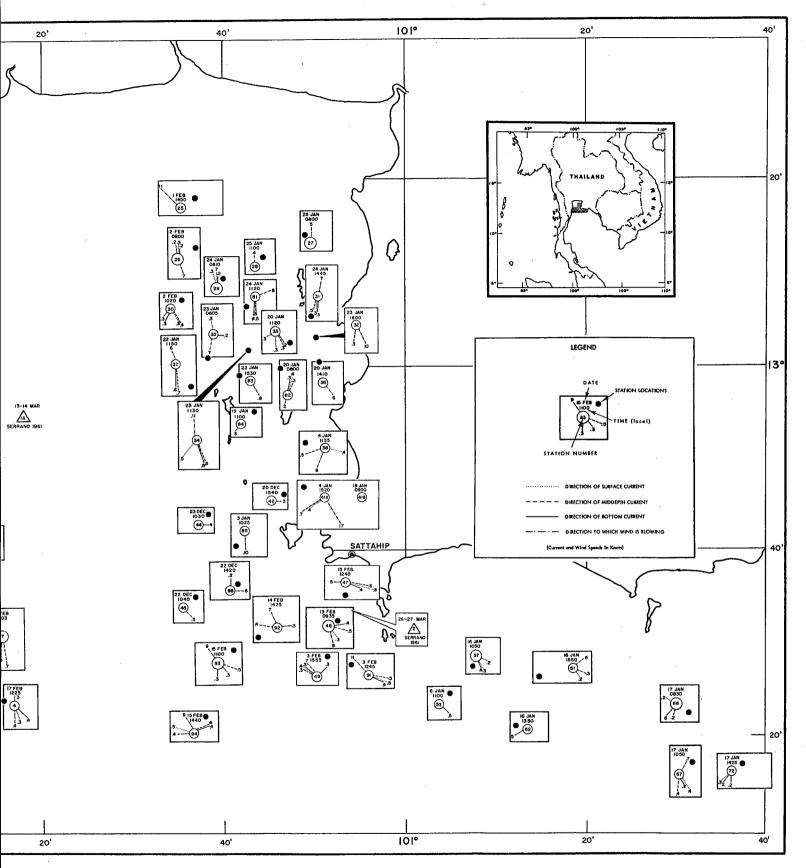


FIGURE 2. Station Locations. The observed current ver and bottom are indicated.



cations. The observed current vectors at surface, middepth, m are indicated.

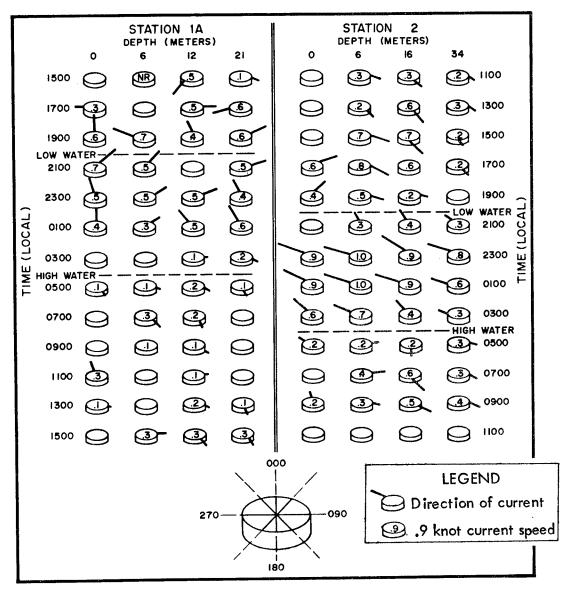


FIGURE 3. Current Data from Two 24-Hour Stations - 1961 SERRANO Cruise.

TABLE I. STATION DATA SUMMARY

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### APPENDIX

# Oceanographic Station Summary Sheets

All measurements are expressed in Meters, Centigrade, and Knots unless otherwise stated.

# WEATHER CODE

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4/10 to 6/10	=	Broken	(Bkn)
7/10 to 9/10	=	Cloudy	(Cldy)
10/10	=	Overcast	(0vc)

# CLOUD TYPE

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	٠			1.2.	118	ন্ত	REMARKS		···		8		66.	32.02	32,00	-		-
	GULF of	THAILAND	MOITOR	0	AIR TENES	ORY 25.6	1				(a/b) 14.3		31.99		32,			
		HAIL	Š	27	AIR.	WE.	SWELL				F.C. (mhos)	i	510	1120	0517			
	1			. 7 N		316					<u>.</u>		0		٦			
		RACHAN	TOUTITION	37.	C CC CITY ONLA	DIR C.	SEA	120	2		TEMP		27,09 ,0510	27.13	27.16			
j	Š	RA(	2	<u>~</u>	Ê	<u> </u>		۲)	-		=		2	2.	5			

DEPTH 0 13

DIRECTION (TT) HEIGHT IN FEET PERIOD IN SEC

WAVES

27.09

BANGRACHAN

13

IITMS

BANGRACHAN THAILAND  15 12 37.31 N 100 09.91E  15 12 37.31 N 100 09.91E  27.41 SPEED 104.013 SWELL  MANUES  SEA SWELL  ORECTION FT) 080  HEIGHT IN FEET 5  DEPTH TEMP E.C. (abon) SAL (4'00)  0 27.41 0.0511 32.05  19 27.41 0.0513 32.10	ur.			ני	40°	אס דיס רכ
15 12 27-13 SPEE ANNES ANES ANES ANES ANES ANES ANES A	×+ <b>44.</b>	THAILAND	AND	-1 -1 J		COS GRT
15 12 27.0.13 special	,300	POHO	LOHOITUDE	EEFTK	CUR STANO	BT SLICE NO
E W O	37.31N	00	09.91E	22	NAMES OF MICH.	% ⊗
	i	AIR TE	- Person	BAR CHETER (RES)	BEATHER	Subus.
··	SPEED 10+01 2 DRY 26 7	VET	2,20	1.7 400.000	C1dy	Cldy covery/10
	SEA	SWELL	REMARKS			3
11111	080		<u> </u>			
			-			
6			<u> </u>			
6	-		200		CURRENT	
	E. C. Vanos		l	CEPTH	SPEEDKRTS	OIR PT)
	150°   177	-	32.05	ı	i	:
	17 •0513	3	32,10			
		-		•		
			L.,			
		<u> </u>				
						-

H THERE	HTMS	GULF of	ULF	<u>ن</u> 0	P118	0)	ž (
BANG	BANGRACHAN	THI	THAILAND	AND	<b>D</b>	7 r.eb. 00	0430 CKT.
CH 80	LATITUDE	-2367	LONG	LONGITUDE	DEPTE	CUR STA NO	D. 31114 14
r-1	12 11	N. 2.	100	12 41.2'N 100 02.8'E	7.	17	ρÒΓ
SEA SURF TEMP	WIND (Floris)		AIR TE	AIR TEMP J. DA	BANCHETER(KES)	TRATHER	CLOUDS
07 40			WE	2 2 2		5	COVER ()
Z		<u>.</u>	ORY.	29	. <del> </del>		TYPE 0
WAVES	SEA		Swell	L Breakks	RKS		
DIRECTION	rn   120						
HEIGHT IN FEET	7	KB Sta			•		
PERIOD IN SEC		- T.MEB					
		:	-			CURRENT	
r Land	E S	E. C. (mbos)	<del></del>	SAL (* 00)	DEPTH	SPEEDIKTS	הייאוס
0	27.69	0517	7	32.04	77	٣	170
9	27.29	1150°	_	32,09	15	2	170
77	27,29	051		32.07			
ange.							
			-				

1111	HTMS	""GULF of	ULF	of.	1	`	TIME
GRA	BANGRACHAN	H	AIL	THAILAND	10 Feb. 68	ο <b>•</b> 6α	0135 G.K.T.
	LATITUDE		LOH	ITUDE	EEPTH	CUR STA NO	BT SLICE NO
18	12 41	N O	00	12 h1.0'N hoo 07.8'E 25	25	18	75
SEA SURF TEMP	THIND (Elen:	3	1 × 1	AIR TEUP	(SEE AND LINE NAS	BEATHER	Cronot , /-
27.21	SPEED 3	3 m	DRY	PRY 26.7	4	Clr	TYPE C1Cm
	SEA	-	SWELL	L REMARKS			
DIRECTION (T)	120	_					
HEIGHT IN FEET	~						•
PERIOD IN SEC		Tall:a					
	9		7	70		CURRENT	
	L E	F. C. (Blood)	ŝ	SAL (7 00)	CEPTH	SPEEDVINTS	DIR (T)
_	77.27	1			m	-2	115
9	27,20	.0512	2	32,06	12		185
23	27,21	•0512	2	32,05	23	2,	230
-			•	•			

WITH	SQ.	OD was	ANEA GULF Of	2740	ا ا ا	07	114g
BANG	BANGRACHAN	THA	THAILAND	<del>-</del> 1	- Feb	TO rep. bo	UZIO SKT
62 50	LATITUDE		LONGITUDE	5	DEPTH	CUR STA NO	BF \$200 40
óř	12 40	1 N. 7.	12 40.4'N 100 12.7'E	Ē	27	19	43
SEA SURF TENP	Or L'inter		7 20 P	BAROHETER(BES)	(524) W	BEATHER	Ednot o
27,50			PRY 30.0		<del></del>	Cldy	TYPE C1Cu
WAVES	SEA		SWELL	REMARKS			
DIRECTION C	ri. Calm	E					
HEIGHT IN FEET	<u> </u>						
PERIOD IN SEC							
24030	TEND	1	,			CURRENT	
	Ĭ.	ر ز ز			DEPTH	SPEEDING	Ereio
0	27.50	9150	6 32,10		m	2	155
10	27.27	1(150	1, 32,10		[2	٣.	150
22	27,29		1	-	22	• 3	125
				_			

MINS HINS	Ω.	GULF of	F of	O For AB	88	ייייייייייייייייייייייייייייייייייייי
BANGE	BANGRACHAN	THAI	THAILAND	0 0 1 1	3	0 (22 G.K.T.
CM SO	LATITUDE	2	LOMAITUOE	KL03	CUA STA NO	BT BLIDE NO
27	12 44	T N.Z.	12 44.7'N 100 02.0'E 12	12 12	21	[]
SEA SURF TEMP	TIND (Elen	1		BARCHETER (RES)	BEATHER	sanot o
27.73	SPEED I	3	1000 3000 4.4		Clr	COVER ()
WAVES	SEA	*5	SWELL AFRANKS	RK S		,
DIRECTION (T)	וו			Curren	Current vectors	rs
HEIGHT IN FEET	ر د ب			very e	very erratic.	
PERIOD IN SEC				•		
DEPTH.	TFUD	(-(-)	(W/A)		CURRENT	
		(man)		DEPTH	SPEEDKKTS	OIR TT
0	27,73	0515	31.90		2	270
7	27.56	0515		77	2	185
10	27,35	.0513	32,00	2		230
						}

Q III	ঠি	10	GULF of	9A76	1. To. Y. A.	120
BANGRACHAN	ACHAN	THV	THAILAND	Ĭ. ⊣	3	0 (40 6.7
Cx 50	LATITUDE		Louitude	DEFTH	CUR 818 XO	Du BEITE ME
5 50	13 18	31N	13 18.3'N 100 37.3'F 16	16	'gyglysgy raw,	ĸ
SEA SURF TEMP	AINO (Elves C.	-	AIR TEMPS 2 BA	BAR GAETER (ZES)	WEATHER	C sarenu
27.16	SPEED 9tol2		MET 2.7.00		CLr	COVER O
KAVES	SEA	1	SWELL REMARKS	8×8		
DIRECTION PT)	150					
HEIGHT IN FEET	3			•		
PERIOD IN SEC		_	}			
DEPTH	TEND	ני ניין			CURRENT	
				DEPTH	SPEED(KTS)	- Elo
0	27.16	-0502	7 31.70		•	
2	27,11	.0506	L			
1h	26,96	-0505				

211	ស	DD vace	ANCA GULF Of	EATE	;	THE
BANGE	BANGRACHAN	THA	THAILAND	2 Feb. 68	. 68	00/10
03 140	LATITUDE	-	LONGITUDE	50774	CUR STANO	BT SLIDE HO
56	13 12.8'N	Z	100 37.218 19	19	56	32
SEA SURF TEMP	WIND (Elen; )		TENE C LUCATI	(52.23) TAC 848	BEATHER	conors
26.89	SPEED 6to8		WET 61.		Clr	COVER U
WAVES	SEA		SWELL REMARKS			
DIRECTION P	611 330		[			
HEIGHT IN FEET	7	_				
PERIOD IN SEC	_					
DEPTK	TFUP	(17/1)	, w. %		CURRENT	
		F. (. (mp. 6)		#Te30	SPEEDVOTS	DIR PT
0	26.89	<b>.</b> 0509	32.02	7	٣.	005
8	26,91	•0508	31.98	2	2	355
17	26.91	0508		77	2	000
						-
	_					

WILL HTMS	ស	ANEACT	AREA CITER OF		DATE		The
BANGE	BANGRACHAN	THI	THAILAND	<del> </del>	25 Jan. 68	1. 68	0050 sxt.
O3 NO	LATITUDE		LONOITUDE		DEPTH	CUE STANO	Dr. 1010 14
27	13 13	N	13 13.7'N 100 49.2'E 16	-21臣	16		59
SEA BURF TENF	WHO (Elen: O)	t	AIR TENE	-	BARGHETER(225)	PEATHER	C TOUCH
26.73			wer 241.5	-V (		E S	cover 6/10
	7	- 1	, ,		•••		n
WAVES	SEA		SWELL	BENARKS	_		
DIRECTION (TT)	180		·				
HEIGHT IN FEET	5			n Whate		٠	
PERIOD IN SEC	_						
HEAL	TEMP	E ( (1)	100/00	- J		CURRENT	
				3	H143G	SPERMITS	L E
0	26.73	.0508		32,12		1	1
7	26.7h	020		32.15			
11	26,76.	60 <u>5</u> 0*	-	11.			
			_				
			, ,				

H.	HTMS	AREA	GUL	GULF of	-	14.4 70.0	25 Isn 68	231.0
BANG	BANGRACHAN	TH	AIL	THAILAND			00 118	0.747 G.W.T.
3.60	TA TA MAN NO IN SIE	711	3 6	),), B	Ę	2074	CUR STA NO	30
2	7	-	) )	0 • t	)			₹ —
SEA SURF TEMP	WIND (Elen: D.)	ď	AIR T	N. C.	8480	GEN. IL JACKA	WEATHER	c savors
10 90	DIR L	20	WET	WET < > 0			5	COVER
T C • O >	SPEED 4	7	DRY.	DRY 30.6			170	TYPE ()
WAVES	SEA		SWELL		REMARKS			
DIRECTION (T)	т. 190	0						
HEIGHT IN FEET	2							
PERIOD IN SEC								
DEDTU	cnst	177	1	δ,			CURRENT	
	Ē J	ا ز ن	 È	345.17.60		HLASS	SPEED(KTS)	OIR PT)
0	26.91	0511		32.14	7			•
11	26.68	•0508	8	32,09	6			
52	26.60	.0507	7	32,11	_			
					-			
					-			
					_			
			Ī		۲			

SEA SURF TEMP	CHAP (E PARE)	3	ALR TEXES	- NAA	BARGUETER(KES)	TEATHER	c rongs
26.70	SPEED	.7 .7	WET 24.44			Bkn	cover0/10
WAVES	SEA	- V	SWELL	REMARKS			
DIRECTION (TT)	170						
HEIGHT IN FEET	~						
PERIOD IN SEC		_				•	
7.000	9701	1 1 1	1			CURRENT	
HI JOSO		ر ز ز	_	 3	DEPTH	SPEEDKING	DIR
0	26.70	•020	32.1	-7	~	63	310
10	26.71	•0508	32	2	11	2	000
20	26•74	•050	_	7	20	< 2	Appx. 3/10
				_			
				-			

cover6/10 56

24 Jan. 68

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22

RACHAN THAILAND THAILOR 13 09.5'N 100 40.4'E

BANGRACHAN

59

VEREN HTIMES

SWITH THE	র	YMEY	GUL	GULF of	2 Feb. 68	. 68	111
BANG	BANGRACHAN	TH	MIL	THAILAND		}	CACO G.M.T.
03 NO	LATITUDE		LONG	LONGITUDE	W1472	CUR STA NO	ST SLIDE NO
유	13 07	.31N	8	13 07.3'N 100 35.7'E	25	<u>R</u>	33
SEA SURF TEMP	WIND (Elon:		AIR TE	-	STEER LING WY	BEATHER	c tonos
27.09	SPEED .	0770	WET DRY	WET 23.44 DRY 28.11		Clr	COVER I/10
WAVES	SEA		SWELL	L REMARKS	K.8		
DIRECTION (T)	150	Q					
HEIGHT IN FEET	-	_		<u> </u>			
PERIOD IN SEC		_		_			
71030	9734	1, 0, 1	7	, w		CURRENT	
		<u>و</u> ز	·	34617 001	Hicai	SPEED(KTS)	OIR TT)
0	27.09	0512	2	32,09	77	٣.	155
10	26.99	.051	-1	32,09	12	7.	150
20	27,00	•051	-1	32,09	20	٣.	205

TENTA	ফ	ATT GULF OF	B	of O	1,10	oviel Tan KR	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
BANGE	BANGRACHAN	TH	AII	THAILAND	<b>1</b>	aii• 00	U/45 SKT.
OH 50	LATITUDE		NO.	LONGITUDE	DEPTH	CUR STA NO	97 SUIDE -C
<u>بر</u>	13 05	N.9	8	13 05.6'N 100 49.9'E 25	25	31	28
SEA SUR! TEMP	WIND (Slee:	8	A A		BANGALTER (M255)	PEATHER	CLOUDS
00 40	DIR	?	WES	0.42		1	COVER 0
77017	SPEED 5to8	<b>to</b> 8	DRY.	DRY 28.4		110	TYPE O
WAVES	SEA		SWELL	LL REMARKS	52		
DIRECTION (TT)	160						
HEIGHT IN FEET	2	_			•		
PERIOD IN SEC		_				,	
DEPTH	TEMP	E ( (mb/m)	12	100/00 143		CURRENT	
		;	 }		DEPTH	STAIGES	L SEG
0	27.22	2150	_	32.01	17	۲,	001
11	26,84	6050		32,10	13	\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.\.	190
23	26.85	<b>.</b> 0509		32,10	23		187
						_	
·							
							•

띪	-		ļř		1				}	-	<del> </del>	┼	<del> </del>	-	<del> </del>	-
20 Jan	N1 420	.E	BARCHETER (X35)			-				DEPTH	6	2	2			
f of	LOHBITUDE	100 47.518 31		PRY 20 1,	PENANKS		1	1	2	SAL (7 00)	32.00	32.10	32.12	32,11		
THAILAND	FOR	5'E 100			-					F. C. (B)08.	0512	0510	0510	0510		   
HTMS BANGRACHAN	LATITUDE	13 02.6'E	WIND (ELm:	SPEED 3	SEA	_			$\vdash$	Z Z	┼	26,87	26.88	-		
TH. HT. BANG	Cx 20	33	SEA SURF TEMP	27.06	KAVES	DIRECTION FT)	HEIGHT IN FEET	PERIOD IN SEC			0	7	177	29	-	
	·				<u> </u>						-					_
23 Jan. 68 0855 GALT.	BT SLIDE NO	25	C thuts 0 /5	cover 7/ IU						DIR	175	190				
m. 68	CUR STA NO	32	WEATHER						CURRENT	SPEEDKRIS	< <b>.</b> 2	6	< .2			
23 Ja	CEPTH	可 19	BAR GAT'S EN (N.25)		iks .					CEPTK	3	10	18			
GULF of	LONGITUDE	91 E19.05 001 NI	25 C 2561 MILE	PRY25.6	T REMYRKS	_		<u> </u>	100/01		32,10	32,10	32,09			
THAILAND		1 10(		 , ப	SWELL	 			E ( (m) 00)		•512	0510	0509			
IS	LATITUDE	13 03.1	C (Elen: 2	SPEED 8to]	SEA	035	~		CASI		27.07	26.91	26,83			
BANGRACHAN	Q# 50	32		27.07	WAVES	DIRECTION (T)	HEIGHT IN FEET	PERIOD IN SEC	ОЕРТИ		0	7	17			

01/20 01/1

20 Jan. 68

87 SLICE NO

CUA STA HO

13

33

COVER 1/10

E SST

SPEEDWIX

CURRENT

	YESSEL H	HTMS	AMEA	GULF OF	 	DATE	;	Tinck
E	BAN	BANGRACHAN	H	THAILAND		23 Ja	23 Jan. 68	0105 627
	0 NO	LATITUDE		LONGITUDE		OEPTH	CUR STANO	Dr. Stude and
	35	13 01	N.0.	13 01.0'N 100 38.5'E	7.	59	35	23
	SEA BURY TEXP	O FC LONIS ONLA		AIR TEMP	- BARO	BARCHETER (MES)	SEATHER	CLOUCE
	26.94			DRY 29 L		**************************************	Bkn	CONDALL/10
	WAVES	SEA	_	SWELL	P CMARKS			3
_	DIRECTION	rr) 025	25	ŀ				
	HEIGHT IN FEET	3						
	PERIOD IN SEC		_					
	DEPTH	TEMP	E C (272)	20,000	ا غ د		CURREMT	
				and the	3	DEPTH	Spercykord	1 200
	0	26.94	.051		32.16	3	.3	350
	177	26.91	0511		32.16		2	Anny 030
	27	26,89	051	1 32	16	25	20	70U
_					-			77

GULF of
BANGRACHAN THAILAND
LATITUDE
13 01.8'N LOO 43.0'E
WHO (Elm. BO
SPEED 9tol2   WEY 25.0
SEA SWELL
220
3
-
TEMP F C (mlvs)
27,03   ,0512
26.95 0512
26.96   0512
_

A XO	2	٦						ENT	250		7	,				
CUR 81	<u>~</u>	BIATHE	Clr					CUR	5		'		-	_	_	
NT430	5,8	CHETER(ZES)		×s					DEPTH	~	2	ኢ				
TUDE	37.91E	-	220			1	<del>-</del>		3AL 17 W)	32.71	32	32.11.	32.12			
LONG	N 100	ALR TE								513	5	7.17	510			
not	57.91	in,	160 5to7	SEA	8	2	4	$\vdash$		_	-	Ľ	_			
LATIT	12	1	m	-	Ļ	ET	U		ž.	27.0	26.9	26.8	126.8			
03 NO	37	SEA SURF TEMP	27.0	WAVES	DIRECTION	HEIGHT IN FE	PERIOD IN SE	1	r i i	0	Ն	S	26			
_		T .	0 2	1	<b></b>					- 	T	ī				T
ST SLIDE NO	20	tanon s	COVER I/I		ities	ord	•		(TT) RIO							
CUR STA NO	36		Clr		veloc:	to nec		CURRENT	SPEEDANTS	marks						
ОСРТИ	19				Current	too low			DEPTH	See re			•			
Tan	50.91E	7	0 70	REMARY				100/201	_	32.10	32.08	8				-
	ĭ	AIN TEN	DRY 3	SWEI				<u> </u>	_		_					_
	e-	, ,	Lto7	EA				ı.							-	
LATITUDE	13 00	WIND (ELM	SPEED	S	-		_	TEMP		27,32	26.83	26,83	,			
0 × 0	36	SEA BURF TEMP	27•32	WAVES	DIRECTION (T)	HEIGHT IN FEET	PERIOD IN SEC	DEPTH		0	8	18				
	LATITUDE LATITUDE CONTINUE STRIDENO 08 NO LATITUDE LONGITUDE	36 13 00.5 N 100 50.9 E 19 36 20 37 12 57.9 N 100 37.9 E 28	13 00.51N 100 50.91E 19 36 20 37.91N 100 37.91E 28 THE FORM THE TENSION THE	13 00.51N 100 50.91E 19 36 20 37 12 57.91N 100 37.91E 28  modified a speed Lto7 DRY 30.55 Clr rype Cjcu 27.08 Speed Sto7 DRY 27.8	36 13 00.51 N 100 50.91 E 19 36 20 37 12 57.91 N 100 37.91 E 28  7. 12 57.91 N 100 37.91 E 28  7	36 13 00.51N 100 50.91E 19 36 20 37 12 57.91N 100 37.91E 28  7. 12	3 00.51	3 00.51N   100 50.91E   19   36   20   37   12 57.91N   100 37.91E   28   28   20   37.01E   28   28   29   20   37.01E   29   3	3 00.51N   100 50.91E   19   36   20   37.91E   28   28   28   28   28   28   28   2	13 00.51N 1200 50.97E 19 36 20 37 12 57.91N 1200 37.97E 28	3 00.5 f N   100 50.9 f E   19   36   20   37   12 57.9 f N   100 37.9 f E   28   12 50.0 f N   100 37.9 f E   28   12 50.0 f N   100 37.9 f E   28   12 50.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.9 f E   28   12 57.0 f N   100 37.0 f E   12 57.0 f N   100 37.0 f N	3 00.5 f	3 00 5 1	3 00.51N   100 50.97E   19   36   20   37.97E   28   28   20   37.97E   28   28   20   36.00   37.97E   28   32.30	3 00.51N   100 50.91E   19   36   20   37   12 57.91N   100 37.91E   28   28   20   20   27.08   27.	13 00.51N   100 50.91E   19   36   20   37   12 57.91N   100 37.91E   28   28   20   20   27.08   27

0450 62.

COVER 0

200 177 180 180

	Yesser HT	HTMS	7111	GITTE OF	67 Tot shoot	1	1000
G.M.T.	BANG	BANGRACHAN	TH	THAILAND	ि । । ।		0,000
o z	03 NO	LATITUDE	-	LONGITUDE	DEPTH	CUR STA NO	24 30128 78
	l <sub>1</sub> 1A	12 46	.9'N L	12 46.9'N 100 49.4'E	25	h1A	<b>©</b>
	SEA SURF TENP	AINO (Éles:	,	UR TEMP	BARCHETER(225)	PEATHER	CIPCIS
	26.77	SPEED T	5to18	SPEED 15to18 ORY 27.8		CIr	COVER 0
	WAVES	SEJ	A .	SWELL REMARKS	AKS		
	DIRECTION (T)	rr 330	0				
	HEIGHT IN FEET	<u>1</u>					
	PERIOD IN SEC		_				
	DEPTH	TEMP	(m) 2	, en 6/m		CURRENT	
F					DEPTH	SPEEDINTS	i Ko
	0	26.77	•0506	131.91	3	η•	235
10	10	26,74	•0505	31.91	2	2	2/10
	50	26,76	•0509	33	1	•	

>		8			Š	PIG	ğ	PER	į	j 2						
															*******	
Tier	U435 G.M.T.	BT SLIDE NO	2	COVER O						DIR (TT)	SOL	ንላላ				
		CUR STANO	38	Clr					CURRENT	STAKE	7.	٠	-2			
L. Tan 68	7 641	DEPTH	21	BAR CALTER (233)	֓֡֓֜֜֜֜֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓֓					DEPTH	~		18			
of of	AND	LONGITUDE	12 51.8'N 100 48.5'E	WET 19.5 BIRY 25.6	LL REMARKS	 			(W/Q)	200	31.90	31.90	31.89			
AREA GULF OF	THAILAND	LON	8'N 100	[]	SWELL				E ( (=) (=)		0507	.0503	.0503			
70	ACHAN	LATITUDE	12 51.	THE SPEED STOIL	SEA	•			TEND		26.55	26.52	26.50			
YELL HTMS	BANGRACHAN	0 H 40	38	26,55	WAVES	DIRECTION (TT)	HEIGHT IN FEET	PERIOD IN SEC	HTGEO		0	10	20 5			

SMIH		And Co.	GULF of	T. O.L.	Tan 68	0.200	SMLH Tarres		Anth GIII.R OF		9446 CO	O 100 67 CO OCT	100
BANGE	BANGRACHAN	THA	ICHAN THAILAND			G.W.T.	BANGRACHAN		THAILAND		Š ,	) 0	UOZIU CKT.
9	LATITUDE		ONGITUDE	27430	CUR STANO	BT SLIDE NO	CX 10	LATITUDE	LIBROT	no.	DEPTH	CUR ATA NO	97 \$JCE NO
817	П2 46.9	N.	00 49.4	回 19		16	75	12 46.2'N 100 46.8'E 24	00T N.	16.81E	24	THE STORE WE ARE	r-l
SEA BURF TENP	WIND (Elen:	1	AIR TEMP BA	BARCHETER (BES)	WEATHER	CLOUDS	SEA SURF TEMP	WIND (Elent	+		BAR OMETER (XES)	NATURE OF THE PERSON NATURE OF	C Louis
26,91	SPEED ()	¥ ō	DRY 20			COVER 2/10	-	SPEED 24.		wer 22.8	-	۴.	CONER ()
WAVES	SEA	] š	SWELL	14.8		30	WAVES	00 20 -	7	200	1		a
DIRECTION PT)							DIRECTION	270	SWELL	Τ	,		
HEIGHT IN FEET					•		HEIGHT IN FEET	+		1			
PERIOD IN SEC	_	_		٠.			PERIOD IN SEC	-		ļ			
DEPTH	TEMP	F.C. (whos)	100/A		CURRENT				_			CURRENT	
K				DEPTH	SPEEDIKTS	OIR PT)			E. C. (mbos) S	24L (3 00)	DEPTH	1	- aid
2	26.91	•0511	32.16	ı	•	•	0	27.45		1		-	
8	26,86	•0511	32.16				12	27,01	-	-			į
18	26.87	0511	32,17				23	27.02					
		.											
										<u> </u>			
1									-	†			

YELLE HTMS	10	ANKA	GITT.F OF	\$ C	DATE	,	TIME
BANGE	BANGRACHAN	THA	THAILAND	QN	23 De	.c. 67	23 Dec. 67   0330 <sub>6.M.T.</sub>
03 NO	LATITUDE		LONGI	TUDE	DEPTH	CUR STA NO	BT SLIDE NO
111	D2 44.	ير ح	<u>8</u>	12 44.3°N 100 38.4°E 38	38		<b>-</b> ⊐
SEA SURF TEMP	70 Kital Onla	74	AIR TEN	*** 0 03	(SERCHETTER CHASE)	VEATHER	c tovos
27.21	SPEED 14	g _	WET DRY	WET 22.2		Clr	COVER 0
WAVES	SEA	_	SWELL	REMARKS			
DIRECTION (TT)	. 280	_		_			
HEIGHT IN FEET		-		Ī			
PERIOD IN SEC		_		<del>-</del>			
DEPTH	TEMP	F.C. (mhos)		100/01/19		CURRENT	
			_		DEPTH	SPEEDKIN	OIR TT)
0	27•21	1		ı	1	ı	9
10	27.07		-	8			
23	27,10	1	-	,			
37	27.09	1	_				
			-				
			-				_

2000	13 Feb. 68 0540	S.K.	DEPTH CURSTANO BT SLIDE NO	5'E 25 47 45	BARCHETER(ESS) WEATHER	OVC COVER LU/ LU TYPE St	REMARKS				CURRENT	DEPTH SPEED(KTS) DIR (*T)	8.	001 9 81 00	23		
	GULF of	THAILAND	LONGITUDE	12 35.5'N 100' 53.5'E 25	ALA TENE	NET 22 0	SWELL REM	120	3		_	345 (1 W)	32.21	32.20			
4364				7.5°N						_		E.C. (Blos)	8150° K	3.0516	50517		
	ر بر	BANGRACHAN	LATITUDE	12 3	WIND (Eler:	SPEED 5	SEA	-			9	E L	27.49	27,38	27.35	•	
Vessel, time	SWITH W	BANGH	ON SO	77	TEA SURF TEMP	27.49	WAVES	DIRECTION (TT)	HEIGHT IN FEET	PERIOD IN SEC	7,600		0	6	23		

WITH THE	Ų	YUEY	1111	ę, (±		Parad L	,	174 0.00
BANGRACHAN	CHAN	TH	AIL	THATEAND		Ly	13 Feb. 58	UZ35 GHT.
0x x0	LATITUDE		07	LONGITUDE		DEPTH	CUR STA NO	64 35174 14
8,7	12 32	. 54 N	001	12 32.5'N 100 52.5'E	[1]	38	817	717
SEA SURF TEMP	Corje OKIA	1	AIR T	30		BARCHETERIXES	VEATHER	congo
27.46	SPEED 7to9		WET	WET 22.2			Cl dy	cores9/10
WAVES	SEA	1	SWELL	1	THARKS			
DIRECTION (TT)	360	8	120	0				
HEIGHT IN FEET	2		7					
PERIOD IN SEC		_	ፖ	<u> </u>				
71	9			9	-		CURRENT	
	L E	ا ز ن		34L 17 W		DEPTH	SPECIAL	(TT) F1:0
0	27.46	0518	80	32.26	9	~	~	7.
10	27.49	0518	80	32.23	3	19	ν,	10 10
36	27,52	•0518	- ∞	32,22	2	35	7	080
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1	<b>•</b> • • • • • • • • • • • • • • • • • •			more upot							<del></del>			<b></b>
70855 6.M.T.	35	COVER 5/10		ctions	1t 38m.			Dir.	305	300	13114017			
89 •	49	Bkn		Two distinct directions	for the current at 38m.		CURRENT	SPECIFIC	7.	٣.	~			
3 Feb. 68	07	AN OHETEN (225)	5	distin	the ca			DEPTH	7	20	38			
F of	12 29.81N 100 51.01E 40	WET 25.6 PRY 28.9	T BENYWERS	Two	for		,	34.17	32.24	32.22	32.23	32.23	-	
THAILAND	8 N 100	0	SWELL				1	E. C. (BD04)	•0519	0516	0516	0516		
	12 29.	SPEED 7	SEA	071	~		TEMO		27.63	27.30	7.29	7.30		
THE BANGEACHAN	67	27.63	WAVES	DIRECTION (T)	HEIGHT IN FEET	PERIOD IN SEC	A TO SO		0	-	24   2	38   2		

HT.	HTMS	£ 44.44	AREA GULF OF	A Ton 68		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
BANG	BANGRACHAN	TH	THAILAND	o car.		OUTU G.M.T.
05 NO	LATITUDE		LONGITUDE	DEPTH	CUR STA NO	87 \$-12 E x 3
52	12 24	N. 2.	12 24.7.N 101 04.7.E	8	52	6
SEA SURF TEMP	The (Elast		e. 7 Vaktas Kin	BARCHETER (XES)	WEATHER	Clares
26,58	SPEED 5		ver 20.0		Clr	COVER U
WAVES	SEA	-	SWELL ROW	REMARKS		
DIRECTION P	et) 31	2				
HEIGHT IN FEET	2	_			٠.	
PERIOD IN SEC						
DEPTH	TEMP	F. C. (mbos)	(0,6)		CURRENT	
				DEPTH	SPEEDINIS	(T) EIO
0	26,58	,050	1 31,91	~	ر د ۷	
6	26.54	.0503	3 31.91	٠ ٦	ر ۷	ראפע
19	26.55	050		28	2.7	-
29	26,53	•0503	31			

PANGRA(	' HTMS BANGRACHAN		THATLAND	16 3	Jan 68	0350	PANG	HTMS BANGRACHAN	THATT AND	F Of TIAM	16 Jan. 68	1. 68	0315 ext.
91 10	TATITUDE .	12.00	TATITUDE TOTAL LONGITUDE	00 tr	CUR STANO	ST SUICE NO	0 × 0	LATITUDE	3	LONGITUDE	DEPTH	CUR STA NO	BT SLICE NO
Š.	) 7 7 T	⊐ ≥ •	101 U(•31	Z Z Z	7.5	٥,	- 61	12 25	.5'N ho	12 25.5'N 101 14.8'E	8	. 61	12
SEA SURF TEMP	) (E13) OKIA	\ c	Tarrey O	ROMETER(WES)	TEATHER	Cr/ L 100000	SEA SURF TEMP	ALNO (Elow)	<u> </u>		BAROMETER (X35)	-	c touts
26.54	SPEED 4	)	wer 20 0		Clr	COVER 1/ 1U	26.75	SPEED C		ver 22.2		r C	cover U
WAVES	SEA		SWELL REMARKS	RX S			WAVES	SEA		SWELL REMANKS			
DIRECTION (T)	_		000				DIRECTION (T)	1	2	220			
HEIGHT IN FEET		_	3				HEIGHT IN FEET	<u></u>				,	
PERIOD IN SEC		_	3				PERIOD IN SEC						
ВЕРТИ	t t No	1 1	(-1-) 2 4 (-1-) 2 4 (-1-)		CURRENT		3			£		CURRENT	
-				DEPTH	SPEED/KTS	OIR CT.)		W	E.C. (mbos)	24L (3 00)	DEPTH	SPEEDINGES	(T) RIO
0	26.54	•0505	35.02	m	m.	150	0	26.75	2120	32.31	6	C	715
11	26,54	5050*	32.01	10	2*	112	7	26.72	0510	32.24	000	~	113
27	26.56	•0506	5 32 0h	50	<.2	103	28	26,66	.0510	32,25	22		
	,		-										

30	YESSEL HITMS	ľΩ	OS was	"" GULF of	A net 77	52 KB	200
J 700 6 K.T.	BANGRACHAN	ACHAN	THA	THAILAND	1		0.4.7 6.4.1
BT SLIDE NO	05 NO	LATITUDE		LONGITUDE	DEPTH	CUA STA NO	01 32/2E NO
נו	<b>%</b>	12 22	4 N. 9.	12 22.6'N 101 31.3'E 31	'E 31	99	13
50.00	SEA SURF TEMP	WINO (Elex.)		AIR TENE	PARCHETER (285)	WEATHER.	tanot o
) M	56,66			NET 21.	***************************************	Clr	COVER 0
	WAVES	Y3S		SWELL	REMARKS		
	DIRECTION (T)	170	0	Ī			
	HEIGHT IN FEET	3				٠.	
	PERIOD IN SEC	:	_				
	DEPTH	TEMP	F. C. (mhos)	100/01/10		CURRENT	
DIR (T)					DEPTH	SPEED(NTS	OIR CT.)
	0	26.66	•0512	32,37	7 3	-2	305
150	15	26.65	.0511	32,36	5 15	3	107
8	8	26.67	0512	32.30	5 28	< 2	310

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										,		,		·	-,	.,	 +
Tiret	0,000	BT SUIDE NO	11	500013	COVER U						DIR (TT)		150				
	16 Jan. 68 0700	CUR STA NO	62	WEATHER	r C			,		CURRENT	SPEEDKATS	< •2	<				
3114	T6 J	DEFTH	<u> </u>	BARGAZTER(225)		2					DEPTH	~	5	28			
GULF of	THAILAND	LONGITUDE	12 21.2.1 101 N'2.15 21	AL C LOWST ALL	DRY 27.8	TT BENTAKE	-			100/01		32.35	32,34	35.36	32,34		
UD AMER	THA	3	21N 10	0,40		SWELL			_	ال (۱۳۲۳)	(acres)	<b>.</b> 0514	.0512	.0513	.0512		
HTMS	BANGRACHAN	LATITUDE	12 21		SPEED	SEA	•		_	TEMP		26.85	26.77	26.76	26.75		
TH HI	BANGE	03 NO	29	SEA SURF TEMP	26 <b>.</b> 85	WAVES	DIRECTION (T)	HEIGHT IN FEET	PERIOD IN SEC	DEPTH		0	10	20	30		

SMIH	S	UD VIII	GULF of	9A16 7	07	7 to 0
BANGE	BANGRACHAN	THAILAND	LAND	T ( 05	m• 00	1 Jan. 00 U35U GR.T.
03 KO	LATITUDE	101	LONGITUDE	DEPTA	CUR STA NO	BT SLICE NO
. 67	12 17	.2'N 10.	12 17.2'N 101 31.8'E	25	29	14
SEA BURF TEMP	ATHO (Elem)			AAROMETER (EES)	FEATHER	c sange
26.93	SPEED 7		wer 21 .1		Clr	COVER U
WAVES	SEA	-	SWELL REMARKS			
DIRECTION (*	(12)					
HEIGHT IN FEET					į	
PERIOD IN SEC						
					CURRENT	
0.F7	E E	E. C. (maon)	34617 80	DEPTH	SPEED(KTS)	ET RIO
0	26.93	•0515	32.43	3	7.	147
11	26.93	\$150	32.13	10	17.	185
22	26.92	.0515	32.43	32	•2	150
33	26.61	.0512	32,43			

THE HIMS	ST.	AMEA GULF Of	بئ 0 بئا	77.7	17 Jan. 68	0725
BANG	BANGRACHAN	THAILAND	AND	} -		SET
03 KO	LATITUDE	2	LONGITUDE	DEPTH	CUR STA NO	04 10 TO 10
22	12 17	.31N 110.	12 17.3'N LO1 37.7'E	33	. 72	15
27.33	SPEED 2to5		WET 22.2	BARCHETER(XES)	Clr	COVER 0
WAVES	SEA	{	SWELL REMARKS	a x		
DIRECTION (T)	1) 030					
HEIGHT IN FEET	F-				٠.	
PERIOD IN SEC						
	9		, 10/cm		CURRENT	
		E. C. (mason)	305 (7 00)	DEPTH	SPEEDIKTS	Dia Rio
0	27.33	•0519	32,15	٣	۲,	235
13	26,96	9150	32.15	16	< 2	סרכ
22	26.95	0516	32.15	۲.	2	ر م
32	26.96	9150	32.15			

E.C. (who) SAL (4'00) DEFTH SPEEDKITS DIR TT)  • 0515 32.24 3 • 3 090  • 0515 32.24 11 • 3 230  • 0515 32.24 11 • 3	SAL (9'00) CESTH SPEEDKING 32.21 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	CURRENT  CESTH SPEEDKING  3 3 3 1 1 1 1 3 1 1 1 1 1 1 1 1 1 1 1
SAL (9'00) CEFTH SPEEDANTS (32.2)4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	SAL (9'00) CEFTH SPEEDINTS 32.214 3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .	CURRENT  DEPTH SPEEDATS  3 9 3  11 0.3
32.21 3 3 32.21 11 3 32.21 11 3	32.21 3 3 32.21 3 3 32.21 11 3	обетн speedking ( 3 03 1 1/1 03
32.24 3 .3 32.24 14 .3 32.24	32.24 3 .3 32.24 14 .3 32.24 14 .3	3 • 3
32.24 14 3	32.2h 1h .3	£. 1/I
		32 <b>.</b> 24

TH THE	HTMS	AMEA	BULF	ANTA GULF OF	21 Je	21 Jan 68	סנינט
BANG	BANGRACHAN		IAII	THAILAND	<b>,</b>	•	G.N.T.
05 KO	LATITUDE		LON	317 UDK	DEPTH	CUR STA NO	87 SC 26 NO
81	13 06	N.9.9	200	13 06.6'N 100 42.8'E	56	87	27
SEA SURF TEMP	Ch Cieria) Chia		AIR T	Taxa	BARCHETER (225)	WEATHER	croces ,
27.00	DIR		WET	0.67		E P	COVER 11/10
,	SPEED 7.08		DRY	DRY 31.1		i	TYPE Cu
WAVES	SEA		SWELL	L REMARKS	**		
DIRECTION	ет) 120			<del>-</del>			
HEIGHT IN FEET	۲.						
PERIOD IN SEC							
DEPTH	TEUP	(-Par)	3	9,		CURRENT	
		ا ن ن		375	DEPTH	SPEEDKITS	DIA PT
0	27,09	J		1	7	ν	180
12	26.93	0511	-	32,17	13		180
277	26,95	.0512	2	32,16	277	77	8

	-		6	-		Įž.	O	-	ł	1	ŝ	5	1	$ \alpha $			
GE,	TAND	LONGITUDE	0 42	AIR TEMP	WET 25.0					ĺ	3AL (7 00)	32.	32.1	32.18			
GULF of	THAL	9	12 59.0'N 100 42.9'			1					E. C. (mbos)	0516 32.17	0512 32.17	0.511			
=	_		59.01	6	SPEED 7409	SEA	180	~		(	ر ن				L.		-
r0	CHAN	LATITUD	12	TAS (Elen.	SPEED	_		-	_	9	<u> </u>	27.45	26.95	26.91			
YENER HTMS	BANGRACHAN	05 KO	83	SEA SURF TEMP	27.45	WAVES	DIRECTION (T)	HEIGHT IN FEET	PERIOD IN SEC	niado		0	6	19			
				1	<u> </u>	1-							Ι	_	Т-		T
0010	2 .	BT SLIDE NO	18	tanata	COVER 5/10	X					DIR (TT)	01.5	025	2 7			
n• 68		CUR STA NO	82	PEATHER	Branch	+		•		CURRENT	SPEED(KTS)	77.	~	٤			
20 Jan. 68			ᄄ	BARCHETER (RES)							DEPTH	m	15	27			
of	g		6.5¹E	_	<u>ې س</u>	REMARKS	i	1		100/01	3	32.10	10	32,10	32,10	-	-
GULF of	THALLAND	Longitude	7 00	AIR TEMP	PRY 28.3	SWELL							32	32			-
O T			N.8			_	_			(m) L		•0509	0509 32,10	0509	6050		
	RACHAN	LATITUDE	12 59.8'N 100 46.5'E 31	WIND (Elen:	DIR ULS SPEED 2	SEA	130	_	1	TEKS		26.81	26.83		26.79		
HTMS	STA	_		Γ		_	(T-)	EET	ည္		_	26	26	26	26		_
H Accord	BANG	2	82	SEA SURF TEMP	26.81	WAVES	DIRECTION (*T)	HEIGHT IN FEE	PERIOD IN SEC	OEPTH		0	6	78	20	`	

0830 GXT

22 Jan. 68

B: \$\_12.8 NO

22

.83

0 CF 1 K

100 42.9'E 21

cover 1/10

Clr TEATHER

Current velocities too

low to record.

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CURRENT

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	SWITH TIME	S	1	HIII.	GITT.F. OF		DATE		1	
F.	 BANGE	BANGRACHAN	THA	THAILAND	ND ON		3 Jan. 68	. 68	03	0325 GH.T.
	 ON SO	LATITUDE		Low	LONGITUDE		DEPTH	CUR STA NO	-	C+ 35/7 18
	85	12 41	12 41.0'N 100 41.9'E 43	100	1, 1,1.	91E	113	******	<del></del>	9
	SEA SURF TEMP	Elen	9	AIR TENP	1	μ.	NARGHET ER (2/55)	WEATHER	tangra y	
9 :	27.05	SPEED8		WE.T	WET CU . U			Clr	COVE	COVER 1/10
Ţ	 WAVES	SEA		SWELI		REMARKS				
	DIRECTION P	PT 000	-		Ī					
	HEIGHT IN FEET	7			-			٠.		
	PERIOD IN SEC		_							
	DEPTH	TFMP	(m)	3	9	اــــــا §		CURRENT		
			; ;	<u> </u>	246	3	DEPTH	SPEEDINTS	_	OIN (T)
	 0	27.05	.0510	0.	32,03	~	1	8	-	
	13	27,05	.0510	C	32.03	~				
	56	27,01	0510	0	32.0	3			_	
Γ	 T T	27.00	0510	0	32.0	~			-	
						_			_	

PANGRA	HTMS BANGRACHAN	D H	ULF	GULF of	19 Jan 68	1 68	0530 CH.
<sup>1</sup> 8	12 55	3°N	100	12 55.3'N 100 43.4'E 34	34	97	17
27.39	SPEED2 tol		ли тем. WET 2Ц	Nω	Would be	CLr	COVER 1/10
WAVES	SEA	_	SWELL	REMARKS			
DIRECTION PT)	71 025			[			. —
HEIGHT IN FEET	-			1			_
PERIOD IN SEC	_	_		1			- <del>-</del>
MAGAG	#FUD	F (-1-1-)	-	8		CURRENT	
		<u>آو</u> ز	3		DEFTH	SPEEDINGS	OIR T
0	27,39	9150	-	32,20	~	,	5
11	26.97	2150	-	32,19	13	ر. ۷ ۲. ۵	1,50
22	26.96	.0512		32,19			
32	26.94	.0511		32.20			
			_				

1	,	170	GULFOI	4.104	0.0	00 00 69	
BANGRACHAN		THAILAND	AND	NA-4-1-4	7 7 7	 O	U COCOKIT.
LATITUDE		LONG	LONGITUDE	-	DEPTH	CUR STANO	BT SLIDE NO
12 36	N. o.	601	11.1	田	719	88	~
WIND (Elen:	7	AIR TE	200	BARG	ETER (RES)	BEATHER	CLOUDE
DIR C	ر ر	YET DBV	スペック			Clr	COVER O
2	to/		30.05				0
SEA		SWEL		MARKE			
•	_	•					
	-						
	_		ļ.				
9	1		9			CURRENT	
E S	<u>ق</u> ن	•	3AL (4 C)		H1430	SPEEDKITS	DIR (TT)
7.52	1	-		_	2	4.2	325
2.09	ŧ	_	•		30	< .2	000
7.03	١		ı	-	777	.2	015
7.07	ı	_	ı				
		_					
		-		-			
	12 36, who (film; 2) spec 5, s	12 36.91N who (film 275 speed 5407 speed 5407 TEMP E.C. (m) 27.52 27.09 27.03	12 36.91N 100 who felm 275 WET SPEED 5407 ORY SEA SWELL SEA SWELL TEMP E.C. (aboa) 7.02	12 36.9 t N 100 41.4	Swell 841,9/00   11,0/10	100 11 11 2 1 E	100 11.1 15 1,6    100 11.1 1   1,6    100 11.1 2   1,6    100 11.2 3.9    100 11.1 2   1,6    100 11.1 2

HTMS	ম	Ino	GULF of	OATE 3 Fe	3 Feb. 68	0.501.5
BANG	BANGRACHAN	THAI	THAILAND	`	- 1	C K.T.
CN SO	LATITUDE	١٥٦	LONGITUDE	X Tage	CUR STA NO	87 8.:: 6 40
16	12 27	01 N'8.	12 27.8'N 100 54.0'E 35	35	16	34
SEA BURF TEMP	-		<u> </u>	BARCARTER(X35)	TEATHER	C 10000 3/10
27.32	SPEED 11		DRY 29.1		CIr	TYPE Cu
WAVES	SEA		SWELL REMARKS	x s		
DIRECTION (T)	150					
HEIGHT IN FEET	3				٠.	
PERIOD IN SEC	_					
	i i		20,		CURRENT	
,	3	E. C. (mbos)	3AL (3 00)	DEPTH	SPEEDKITS	DIR (T.)
0	27,32	•0516	32.26	1/	•5	110
8	27,32	9150	32,26	19	٦,	100
20	27,36	.0517	32.27	33	7	115
3.3	27,03	0513	32,27			

TH THE	HTMS	AMEA GULF OF	ULF	of	7), F	1), F. 68	11 O 7 O K
BANG	BANGRACHAN	EL —	AIL	4ND	1	•	G.H.T.
03 KO	LATITUDE		LONG	1005	DEFTH	CUR STANO	BT SLIDE NO
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27.54	SPEED 5to8		WET	NET 25.0		EKA EKA	COVER 41/ LU
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PERIOD IN SEC		_					
	9		-	7		CURRENT	
N N	- Ex	E.C. (mbos)	8	3AL (3 (2)	ととは日日	SPEED(KTS)	OIR TT
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j •	SPEED &	to10	ORY	27.8			TYPC1Cu
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13. ABSTRACT			

The U.S. Naval Oceanographic Office and the Royal Thai Navy conducted a joint environmental survey in the Gulf of Thailand from 20 December 1967 to 21 February 1968. Operations included serial-depth temperature and salinity measurements at 57 station locations and current meter observations at 47 of the stations.

The area surveyed in the Gulf of Thailand was found to be nearly isothermal and isohaline throughout the water column which attests to a well-developed mixing environment. The tidal currents in the gulf are thought to be responsible for the homogenous nature of the water. Characteristic of the region surveyed was the variance in current direction with depth for any one station location and the change in current vectors over short durations. Measured current speeds ranged to a maximum of 0.8 knot.

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